



United States Department of the Interior  
FISH AND WILDLIFE SERVICE  
COLUMBIA NATIONAL FISHERIES RESEARCH LABORATORY  
ROUTE 1  
COLUMBIA, MISSOURI 65201

IN REPLY REFER TO:

September 15, 1981

40111302



Col. Robert J. Dacey, District Engineer  
St. Louis District, U.S. Army Corps of Engineers  
210 Tucker Blvd., North  
St. Louis, MO. 63101

Dear Col. Dacey:

The following letter summarizes progress in the final quarters of FY-81 on our study of trace metal dynamics for the Pine Ford Lake Project.

In our progress report of May 19, 1981, we stated that persistence of drought conditions might not permit the collection of high flow suspended sediment and water quality samples. However, continual heavy rainfall during the spring and summer did afford the opportunity to obtain these high flow samples. Collection of water samples has now been completed at low flow (July 1980), medium flow (April 1981), and high flow (May 1981). Filtered and unfiltered water samples have been analyzed for Pb, Cd, Cu, Zn, Fe, Ag, Mn, and Ba. Data from the low flow samples were included in an earlier progress report. Results from the analysis of medium and high flow samples are enclosed. Detectable concentrations of Pb and Cd were found in samples taken downstream from the tailings pond dam break at both medium and high flows.

Although heavy rains enabled us to complete our water samples, they have greatly impeded our progress with the second mussel accumulation study. We had planned to initiate this study in the spring and attempted to do so in May 1981. Unfortunately, continued high water events since that time have caused the mussel study to be washed away three times. Completion of this study is now scheduled for October.

Collection of sediments from all locations was completed in August 1981. The sequential extraction, particle size analysis, organic content determination, and heavy metals analysis of these samples is underway.

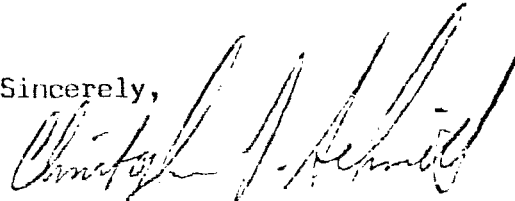
Heavy metal analysis of samples that were collected in the biota survey of summer 1980 has been completed. This survey included

longear sunfish, smallmouth bass, redhorse suckers, catfish, crayfish, freshwater mussels, algae, and aquatic macrophytes. All samples collected at locations on the Big River below the tailings break contained higher concentrations of Pb and Cd than samples from the control site near Irondale. Further analysis of the data is in progress.

A study to determine the responses of aquatic invertebrates to Pb and Cd contamination is nearing completion. Field collections at 5 locations on the Big River will be completed in October 1981. Invertebrate samples are being divided into four major functional groups (collectors, predators, scrapers, and shredders) and analyzed for Pb and Cd. Lab growth studies are also in progress. This study is being completed through a cooperative research agreement with the University of Missouri, Columbia.

Enclosed is a summary of the number of samples that have been collected and analyzed for this study. The only samples not included in this list are freshwater mussels from the second mussel exposure study. Analyses of all other samples have been completed or are now in progress at the Environmental Trace Substances Research Center. Results of these analyses should be in hand by October 1, 1981 and work on the terminal project report will receive top priority. Please do not hesitate to contact me if you or any of your staff care to discuss any aspects of the program.

Sincerely,



Christopher J. Schmitt  
Fisheries Biologist

CJS:lv

Enclosures

Mean trace metal concentration (ppm) in filtered (f) and unfiltered (u)  
water samples from the Big River, Black River, and Clearwater Lake -  
Medium Flow, April 1981.

		Pb	Cd	Cu	Zn	Ag	Fe	Mn	Ba
BIG RIVER DRAINAGE									
Mineral Fork	u	<.005	<.001	<.005	<.01	<.001	.049	.008	.36
	f	<.005	<.001	<.005	<.01	<.001	.023	.008	.35
Brown's Ford	u	.073	<.001	.014	.03	<.001	.630	.130	.38
	f	.006	<.001	<.005	<.01	<.001	.033	.011	.32
Washington State Park	u	.140	<.001	<.005	.07	<.001	.780	.160	.22
	f	<.005	<.001	<.005	<.01	<.001	.036	.014	.16
Highway 67 Bridge	u	.041	.002	<.005	.11	<.001	.430	.084	.07
	f	.009	<.001	<.005	.06	<.001	.037	.025	.09
Irondale	u	<.005	<.001	<.005	<.01	<.001	.260	.074	.08
	f	<.005	<.001	<.005	<.01	<.001	.026	.026	.08
BLACK RIVER DRAINAGE									
Above Clearwater Lake	u	<.005	<.001	<.005	<.01	<.001	.038	.008	.04
	f	<.005	<.001	<.005	<.01	<.001	.010	.003	.04
Below Clearwater Lake	u	<.005	<.001	<.005	<.01	<.001	.180	.032	.04
	f	<.005	<.001	<.005	<.01	<.001	.180	.032	.04
CLEARWATER LAKE									
Surface	u	<.005	<.001	<.005	<.01	<.001	.078	.012	.04
	f	<.005	<.001	<.005	<.01	<.001	.032	.002	.04
5 Meters	u	<.005	<.001	<.005	<.01	<.001	.180	.030	.04
	f	<.005	<.001	<.005	<.01	<.001	.018	.005	.04

Mean trace metal concentration (ppm) in filtered (f) and unfiltered (u) water samples from the Big River, Black River, and Clearwater Lake - High Flow, May 1981.

		Pb	Cd	Cu	Zn	Ag	Fe	Mn	Ba
BIG RIVER DRAINAGE									
Mineral Fork	u	<.005	<.001	<.005	<.01	<.001	.330	.040	.29
	f	<.005	<.001	<.005	<.01	<.001	.040	.008	.24
Brown's Ford	u	.470	.002	.024	.17	<.001	2.600	.350	.22
	f	.023	<.001	.036	.05	<.001	.140	.041	.10
Washington State Park	u	.680	.004	.011	.34	<.001	2.500	.480	.20
	f	.021	.001	.006	.06	<.001	.110	.220	.09
Highway 67 Bridge	u	.110	.003	.006	.15	<.001	.060	.110	.07
	f	.012	.002	.005	.10	<.001	.042	.045	.06
Irondale	u	<.005	<.001	<.005	<.01	<.001	.230	.056	.07
	f	<.005	<.001	<.005	<.01	<.001	.027	.350	.06
BLACK RIVER DRAINAGE									
Above Clearwater Lake	u	<.005	<.001	<.005	<.01	<.001	.090	.015	.03
	f	<.005	<.001	<.005	<.01	<.001	.018	.016	.02
Below Clearwater Lake	u	<.005	<.001	<.005	<.01	<.001	.230	.036	.03
	f	<.005	<.001	<.005	<.01	<.001	.080	.006	.03
CLEARWATER LAKE									
Surface	u	<.005	<.001	<.005	<.01	<.001	.090	.010	.03
	f	<.005	<.001	<.005	<.01	<.001	.010	.006	.03
5 Meters	u	<.005	<.001	<.005	<.01	<.001	.110	.019	.03
	f	<.005	<.001	<.005	<.01	<.001	.020	.004	.03
10 Meters	u	<.005	<.001	<.005	<.01	<.001	.250	.036	.03
	f	<.005	<.001	<.005	<.01	<.001	.040	.021	.02
15 Meters	u	<.005	<.001	<.005	<.01	<.001	.330	.041	.03
	f	<.005	<.001	<.005	<.01	<.001	.030	.008	.03

# SAMPLE INVENTORY AND STATUS

<u>Sample Type</u>	<u>Number of Samples</u>	<u>Status of Analysis</u>
Water	124	complete
Sediment	190	complete
	240	in progress
Fish	143	complete
	30	in progress
Freshwater Mussels	99	complete
Crayfish	8	complete
Plants	14	complete
Blood	97	complete

- An additional 130 freshwater mussels samples from the second mussel exposure study will be submitted for analysis during September and October 1981.